Message

From: Benson, Amy [Benson.Amy@epa.gov]
Sent: 7/10/2017 1:39:49 PM
To: Henry, Tala [Henry.Tala@epa.gov]; Aubee, Catherine [Aubee.Catherine@epa.gov]; Behrsing, Tracy [behrsing.tracy@epa.gov]; Brinkerhoff, Chris [Brinkerhoff.Chris@epa.gov]
Subject: RE: GenX Risk Assessment Knowledge Gaps

And – agree that the first issue is whether the chemicals as identified are really those chemicals given the lack of standards… so please just let me know whether you want this additional comment below (on #4).

From: Benson, Amy
Sent: Monday, July 10, 2017 9:36 AM
To: Henry, Tala <Henry.Tala@epa.gov>; Aubee, Catherine <Aubee.Catherine@epa.gov>; Behrsing, Tracy <behrsing.tracy@epa.gov>; Brinkerhoff, Chris <Brinkerhoff.Chris@epa.gov>
Subject: RE: GenX Risk Assessment Knowledge Gaps
Importance: High

Ex. 5 - Deliberative Process

One of the ethers measured by Sun et al 2016 has the same carbon chain length (C6HF11O6) as GenX with 4 ether groups instead of 1 ether group. But again, given limited knowledge at this time regarding how different ethers' toxicities compares to each other, it is not clear that GenX toxicity data could be used as read-across without more investigation of the ether data (which might give a few more clues).

Although the straight chain perfluoro carboxylic acids (e.g., PFBA through PFDA in table S1 of the Sun paper) show an increase in toxicity with increasing carbon chain length, it is not clear that the same trend exists for the perfluoro ethers without more investigation – and discussion among RAD (and possibly OW, ORD) scientists. On a first look at the ether data that are available, there is not a clear trend by chain length."

From: Henry, Tala
Sent: Friday, July 07, 2017 6:41 PM
To: Aubee, Catherine <Aubee.Catherine@epa.gov>; Benson, Amy <Benson.Amy@epa.gov>; Behrsing, Tracy <behrsing.tracy@epa.gov>; Brinkerhoff, Chris <Brinkerhoff.Chris@epa.gov>
Subject: RE: GenX Risk Assessment Knowledge Gaps

Betsy Behl's email resolves #2.

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From: Henry, Tala
Sent: Friday, July 07, 2017 6:40 PM
To: Aubee, Catherine <Aubee.Catherine@epa.gov>; Benson, Amy <Benson.Amy@epa.gov>; Behrsing, Tracy <behrsing.tracy@epa.gov>; Brinkerhoff, Chris <Brinkerhoff.Chris@epa.gov>
Subject: FW: GenX Risk Assessment Knowledge Gaps
Importance: High

Ex. 5 - Deliberative Process

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From: Risen, Amy J [mailto:Amy.Risen@dhhs.nc.gov]
Sent: Friday, July 07, 2017 6:17 PM
To: Audra Henry <ate1@cdc.gov>; Wheeler, John <Wheeler.John@epa.gov>; Mitchell, Ken <Mitchell.Ken@epa.gov>; Behl, Betsy <Behl.Betsy@epa.gov>; Strong, Jamie <Strong.Jamie@epa.gov>; Henry, Tala <Henry.Tala@epa.gov>; Behrsing, Tracy <behrsing.tracy@epa.gov>; Benson, Amy <Benson.Amy@epa.gov>; Aubee, Catherine <Aubee.Catherine@epa.gov>; Kemker, Carol <Kemker.Carol@epa.gov>; Allenbach, Becky <Allenbach.Becky@epa.gov>; Doa, Maria <Doa.Maria@epa.gov>; Mort, Sandra L <sandy.mort@ncdenr.gov>; Shehee, Mina <mina.shehee@dhhs.nc.gov>; Elizabeth Dittman <Beth.Dittman@dhhs.nc.gov>; Holt, Kennedy <Kennedy.Holt@dhhs.nc.gov>; Langley, Rick <rick.langley@dhhs.nc.gov>; connie.brower@ncdenr.gov; Culpepper, Linda <linda.culpepper@ncdenr.gov>; Holloway, Tracey S <Tracey.Holloway@ncdenr.gov>; Donohue, Joyce <Donohue.Joyce@epa.gov>
Cc: Tina Forrester <txf5@cdc.gov>; Susan Moore <sym8@cdc.gov>; Selene Chou <cjc3@cdc.gov>; Trent LeCoultre <tll7@cdc.gov>; idz7@cdc.gov
Subject: RE: GenX Risk Assessment Knowledge Gaps

Thank you to everyone for providing feedback on our risk assessment for GenX. I'm providing a summary below, which includes points of contact to follow up with. Questions 1-4 were posed by DHHS before the call as main talking points. Text in blue is a summary of the comments. NC DHHS makes every attempt to follow the approach used by the EPA when doing risk assessments. Therefore, we have underlined blue text as take home messages that DHHS will be applying to the GenX risk assessment for NC residents using drinking water originally referenced in Sun et al 2016.

DHHS intends to respond to the public with a new drinking water level and health guidance early in the week of July 10th. We are hopeful that you will be able to provide feedback on cancer and fish consumption ASAP; please see number 5 below for details. I am also interested in data we discussed on interspecies kinetics differences.

Thanks again!
Amy

1) **Animal toxicity studies and the point of departure (POD):** Sufficient data was available to lower the POD NOAEL to 0.1 mg/kg/day (subchronic toxicity test OECD 407 with mice). An uncertainty factor of 10 will be applied for subchronic to chronic extrapolation
    a. We have consensus that the POD of 0.1 mg/kg/day will also be used by the EPA Risk Assessment Division (RAD) for risk assessment of GenX.
    b. Joyce Donohue, Tracy Behrsing & Amy Benson requested that toxicological effects and endpoint descriptions be strengthened so we can be more specific about the effects associated with NOAELs and PODs that are referenced during the risk assessment.
    c. It was noted that PODs on the ECHA dossier are selected and reported by chemical manufacturer rather than the ECHA.

2) **Routes of exposure and the relative source contribution (RSC):** People may be exposed to GenX through routes other than drinking water. The typical value used for RSC in risk assessment of organic chemicals is 0.2, and this is the value used by the EPA for their evaluation of PFOA and PFOS drinking water health advisories. We request guidance from the EPA and ATSDR on the use of an RSC of 0.2.
    a. EPA RAD has not evaluated RSC for drinking water exposures to GenX because drinking water was not previously thought to be a route of exposure to this chemical.
    b. EPA RAD did use 20% RSC for PFOA and PFOS due to ubiquitous presence in the environment and uncertainty about amounts of these chemicals reaching people through the different exposure routes.
    c. EPA RAD uses 100% RSC when looking at exposures to the infant age group.
    d. DHHS intends to use 20% RSC based on the EPA decision tree for deriving water quality criteria (EPA-822-B-00-004) and apply the exposure to children birth to <6years using exposure factors from the new EPA RAGS supplement (OSWER Directive 9200.1-120).

3) **Risk assessment method and interspecies uncertainty factor**: The default value for interspecies variability of 10 is likely to underestimate the toxicity of GenX to humans. We present the EPA method used to extrapolate a human equivalent dose (HED) for PFOA and PFOS in this document. Interspecies uncertainty modeling for PFOA and PFOS yielded a calculated factor of 140 to 710X for kinetics differences and an additional 3X was allocated for other variability across species. The total uncertainty accounted for across species by EPA for PFOA and PFOS was calculated by DHHS and the maximum was 2,100X. We also request guidance from the EPA and ATSDR on an appropriate interspecies uncertainty factor for GenX.
    a. DHHS understands that EPA RAD currently intends to use a UF_{Total}=100 for their risk assessment for the consent order for GenX manufacturing ($UF_{intraspecies}$=10 & $UF_{interspecies}$=10).
    b. EPA: While human PFOS & PFOA clearance rates are slower in humans than test animals, interspecies kinetics variability is not expected to occur at the same magnitude for GenX. The supporting information comes from a comparison of the clearance rates for branched vs linear PFOAs, in which branched isomers are cleared faster; GenX is branched and so would be predicted to clear faster.
        i. DHHS requests references on comparison of branched vs linear PFOAs, renal transfer proteins used, and any additional information helpful in reviewing the prediction of the interspecies variability expected for GenX. Follow up discussions will go through Joyce Donohue, Catherine Aubree, and Jaime Strong as points of contact.
    c. Additional UFs were discussed, including the subchronic to chronic extrapolation. EPA RAD does not use a $UF_{Subchronic-Chronic}$ as part of its typical procedure. DHHS explained our goal to be protective of public health over a lifetime of exposure. EPA explained that EPA IRIS procedure does focus more on lifetime exposures and their risk assessment does add in a $UF_{Subchronic-Chronic}$ of 10.

d. Questions were raised regarding EPA's current review of the GenX consent order and associated risk assessment; now that a release to a water source is known, will the risk assessment include a public drinking water level?

4) **Drinking water concentration guidance for other PFECAs:** The Sun et al 2016 publication identified not only GenX, but also other perfluoroalkyl ether carboxylic acids (PFECAs) present in the Cape Fear River and local drinking water in 2013 and 2014. Quantification of the concentrations of other PFECAs was not possible due to the lack of analytical chemistry standards, however some PFECAs may have been present at concentrations 15 times higher than GenX. Presumed high concentrations are prompting questions about drinking water safety, however no toxicity data is available for these PFECAs. **We request guidance from the EPA and ATSDR on a health protective drinking water value that can be provided to residents of this community. Would it be appropriate to use the PFOA + PFOS health advisory of 70 ng/L?**
   a. Maria Doa and Catherine Aubree will review the PFECAs chemical structures to see if general advice can be given on how much we can read across health concerns from PFOA and PFOS. It is not within the scope of their work on GenX to review PFECAs at this time and it is understood that guidance along these lines may be limited. Amy Risen will provide the supplemental document for Sun et al to clarify the PFECAs in question.

5) Additional questions raised in call
   a. Fish Consumption:
      i. DHHS: The public is asking about safety of fish consumption. Can the EPA make any recommendations?
      ii. EPA: The EPA does not expect GenX to bioaccumulate. There is some data on concentrations in fish from documents that are confidential, as well as some non-confidential data.
         1. The DHHS spoke with Tala Henry after the call for clarification. She explained that the BCF reported by Hoke et al 2016 is low enough as to not typically warrant additional fish consumptions studies. EPA will follow up Monday with a statement with the appropriate caveats for the unknowns of emerging chemicals and limited data.
   b. Cancer Risk Assessment:
      i. DHHS: The public is concerned about the risk of cancer from GenX. We have limited data, but can the EPA suggest a way to convey the risk of cancer?
      ii. EPA: Joyce Donohue will review the raw data from OECD 453 to determine if the notes on the rate of occurrence for liver necrosis are sufficient to calculate a risk. Amy Risen will provide the raw data, which had been provided by Chemours. Amy also has raw data for OECD 407 GenX testing for rats & mice, if needed by anyone in the group.

From: Risen, Amy J
Sent: Wednesday, July 05, 2017 7:38 PM
To: 'Audra Henry' <ate1@cdc.gov>; 'John Wheeler' <Wheeler.John@EPA.gov>; 'mitchell.ken@epa.gov' <mitchell.ken@epa.gov>; 'Behl.betsy@epa.gov' <Behl.betsy@epa.gov>; 'Strong.jamie@epa.gov' <Strong.jamie@epa.gov>; 'Henry.tala@epa.gov' <Henry.tala@epa.gov>; 'Behrsing.tracy@epa.gov' <Behrsing.tracy@epa.gov>; 'Benson.amy@epa.gov' <Benson.amy@epa.gov>; 'Aubee.catherine@epa.gov' <Aubee.catherine@epa.gov>; 'Kemker.carol@epa.gov' <Kemker.carol@epa.gov>; 'Allenbach.becky@epa.gov' <Allenbach.becky@epa.gov>; 'Doa, Maria' <Doa.Maria@epa.gov>; Mort, Sandra L <sandy.mort@ncdenr.gov>; Shehee, Mina <mina.shehee@dhhs.nc.gov>; Dittman, Elizabeth <Beth.Dittman@dhhs.nc.gov>; Holt, Kennedy

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Subject: GenX Risk Assessment Knowledge Gaps

Hello everyone!

NC DHHS has been discussing GenX with both EPA and ATSDR and we really appreciate the help you've been giving us. We'll be holding a conference call tomorrow to talk about the progress we've made on our GenX risk assessment, and talk about knowledge gaps. We'll be asking for rapid feedback within the next week to help inform our risk communications with the public.

I've attached a document for you to review with requests for feedback bolded in purple.

Thanks so much and talk to you all tomorrow!

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